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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

Report Date: January 10, 2019 11:27

Project: Solvay

Account #: 20003
Group Number: 2021040
State of Sample Origin: NJ

Electronic Copy To	Integral Consulting Inc.	Attn: Glenn Esler
Electronic Copy To	Integral Consulting Inc.	Attn: Erin Palko
Electronic Copy To	Solvay	Attn: Mark Christensen
Electronic Copy To	Solvay	Attn: Mitch Gertz

Respectfully Submitted,

Lyssa M. Longenecker

Lyssa M. Longenecker
Specialist

(717) 556-7321

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
V-915 Grab Water	12/19/2018 09:00	9951467
Field Blank Water	12/19/2018 09:00	9951468

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **V-915 Grab Water**
Solvay

Project Name: **Solvay**

Submittal Date/Time: 12/20/2018 14:30
Collection Date/Time: 12/19/2018 09:00

Integral Consulting Inc.
ELLE Sample #: WW 9951467
ELLE Group #: 2021040
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14903	Perfluorobutanesulfonate	375-73-5	0.83 J	0.26	0.86	1
14903	Perfluorodecanoic acid	335-76-2	44	0.77	1.7	1
14903	Perfluorododecanoic acid	307-55-1	1.3 J	0.43	1.7	1
14903	Perfluoroheptanoic acid	375-85-9	54	0.34	0.86	1
14903	Perfluorohexanesulfonate	355-46-4	1.6 J	0.34	1.7	1
14903	Perfluorohexanoic acid	307-24-4	25	0.34	1.7	1
14903	Perfluorononanoic acid	375-95-1	3,500	34	170	100
14903	Perfluoro-octanesulfonate	1763-23-1	6.5	0.34	1.7	1
14903	Perfluorooctanoic acid	335-67-1	440	2.6	8.6	10
14903	Perfluorotetradecanoic acid	376-06-7	N.D.	0.26	0.86	1
14903	Perfluorotridecanoic acid	72629-94-8	1.3	0.34	0.86	1
14903	Perfluoroundecanoic acid	2058-94-8	170	0.34	1.7	1

Sample Comments

State of New Jersey Lab Certification No. PA011

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14903	NJ PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18362006	01/03/2019 21:21	Devon M Whooley	1
14903	NJ PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18362006	01/03/2019 21:31	Devon M Whooley	10
14903	NJ PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18362006	01/07/2019 22:59	Devon M Whooley	100
14904	NJ PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18362006	12/28/2018 07:30	Pamela Rothharpt	1

*=This limit was used in the evaluation of the final result

Sample Description: **Field Blank Water**
Solvay

Project Name: **Solvay**

Submittal Date/Time: 12/20/2018 14:30
Collection Date/Time: 12/19/2018 09:00

Integral Consulting Inc.
ELLE Sample #: WW 9951468
ELLE Group #: 2021040
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14903	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.87	1
14903	Perfluorodecanoic acid	335-76-2	N.D.	0.78	1.7	1
14903	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.7	1
14903	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	0.87	1
14903	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	1.7	1
14903	Perfluorohexanoic acid	307-24-4	N.D.	0.35	1.7	1
14903	Perfluorononanoic acid	375-95-1	0.61 J	0.35	1.7	1
14903	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.35	1.7	1
14903	Perfluorooctanoic acid	335-67-1	N.D.	0.26	0.87	1
14903	Perfluorotetradecanoic acid	376-06-7	N.D.	0.26	0.87	1
14903	Perfluorotridecanoic acid	72629-94-8	N.D.	0.35	0.87	1
14903	Perfluoroundecanoic acid	2058-94-8	N.D.	0.35	1.7	1

Sample Comments

State of New Jersey Lab Certification No. PA011

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14903	NJ PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18362006	01/02/2019 17:23	Devon M Whooley	1
14904	NJ PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18362006	12/28/2018 07:30	Pamela Rothharpt	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 2021040
Reported: 01/10/2019 11:27

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result ng/l	MDL** ng/l	LOQ ng/l
Batch number: 18362006	Sample number(s): 9951467-9951468		
Perfluorobutanesulfonate	N.D.	0.30	1.0
Perfluorodecanoic acid	N.D.	0.90	2.0
Perfluorododecanoic acid	N.D.	0.50	2.0
Perfluoroheptanoic acid	N.D.	0.40	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluoro-octanesulfonate	N.D.	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.40	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18362006	Sample number(s): 9951467-9951468								
Perfluorobutanesulfonate	8.49	7.83	8.49	8.28	92	98	70-130	6	30
Perfluorodecanoic acid	9.60	9.42	9.60	9.43	98	98	70-130	0	30
Perfluorododecanoic acid	9.60	9.84	9.60	9.15	103	95	70-130	7	30
Perfluoroheptanoic acid	9.60	9.54	9.60	9.52	99	99	70-130	0	30
Perfluorohexanesulfonate	9.08	7.82	9.08	8.27	86	91	70-130	6	30
Perfluorohexanoic acid	9.60	9.80	9.60	10.16	102	106	70-130	4	30
Perfluorononanoic acid	9.60	9.56	9.60	9.49	100	99	70-130	1	30
Perfluoro-octanesulfonate	9.18	7.90	9.18	7.31	86	80	70-130	8	30
Perfluorooctanoic acid	9.60	9.07	9.60	8.71	95	91	70-130	4	30
Perfluorotetradecanoic acid	9.60	9.41	9.60	9.93	98	103	70-130	5	30
Perfluorotridecanoic acid	9.60	10.12	9.60	10.27	105	107	70-130	2	30
Perfluoroundecanoic acid	9.60	9.37	9.60	9.07	98	94	70-130	3	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 2021040
Reported: 01/10/2019 11:27

Labeled Isotope Quality Control

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: NJ PFAS in Water by LC/MS/MS
Batch number: 18362006

	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS
9951467	109	50	69	74	64	65
9951468	79	74	80	78	81	83
Blank	80	89	94	88	92	84
LCS	68	67	76	72	72	67
LCSD	86	78	88	87	84	88
Limits:	26-148	35-138	34-126	35-126	48-122	50-121

	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA
9951467	53	61	56	53	54
9951468	82	81	78	83	76
Blank	84	86	75	82	74
LCS	66	64	70	66	62
LCSD	86	89	91	91	81
Limits:	41-144	47-125	30-128	39-130	26-119

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Environmental Analysis Request/Chain of Custody

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Acct. # 20003 Group # 2021040 Sample # 9951467-68

COC # 571677

Client Information

Client: Solvay	Acct. #:
Project Name/#:	PWSID #:
Project Manager:	P.O. #:
Sampler: Christensen	Quote #:
State where samples were collected: NJ	For Compliance: Yes ☒ No ☐

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water Potable ☐ Ground ☐ NPDES ☒ Surface ☐ | Other: ____

Analysis Requested

Preservation and Filtration Codes

For Lab Use Only

FSC: ____

SCR#: 235473

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 P=H_3PO_4
F=Field Filtered O=Other

Remarks

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAS
VF-915	12/19/18	0900	X		2	X
Field Blank	12/19/18	0900			1	X

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Requested TAT in business days: ____

E-mail address: mark.christensen@solvay.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Bottle Storage				12/20/18	1500
	12/20/18	0900		12/20	9:43
	12/20/18	1430			

EDD Required? Yes (No)

If yes, format: ____

Site-Specific QC (MS/MSD/Dup)? Yes (No)

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:

UPS ____ FedEx ____ Other ____

Temperature upon receipt 4.1 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 236914

Group Number(s): 2021040

Client: Solvay

Delivery and Receipt Information

Delivery Method:	ELLE Courier	Arrival Timestamp:	12/20/2018 14:30
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	NJ		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	0
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Ariel Garcia (15332) at 00:11 on 12/21/2018

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT42-02	4.1	DT	Wet	Y	Bagged	N

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.